

FAALC FIBERGLASS SHELTER SPECIFICATION

Revision: 0.0

Revision Date: 3/14/2012

- 1.0 Intent – The intent of this specification is to provide a means of procuring fiberglass equipment shelters for the housing and installation of electronic equipment including but not limited to Navigation, Landing, Lighting and related equipment, communication equipment, weather equipment, engine generators and other equipment for the Federal Aviation Administration (FAA) and other Government sites. Certain items listed within this specification may have further terms and conditions enumerated within the contract documents. They include:
 - 1.1. Submittal process and timeframes.
 - 1.2. Fabrication timeframes, incentives and penalties.
 - 1.3. Transportation/delivery responsibilities.
- 2.0 Scope – This specification covers the responsibilities of the fiberglass equipment shelter manufacturer (hereinafter simply referred to as “shelter manufacturer”) to fabricate and assemble transportable prefabricated insulated fiberglass equipment shelters complete including: interior finish materials, exterior door and frame, hardware, door hood, air conditioner, heating unit, electrical equipment and fixtures. The shelters shall be pre-assembled and fiber-glassed, completely dust-proof and watertight, and shall be completely shop-fabricated with the required appurtenances. The shelters shall be designed for the explicit use of housing and maintaining electronic equipment and related components within an environmentally controlled atmosphere by maintaining the proper operating conditions for the equipment.
- 3.0 General – Except for any items specifically identified herein as being “Government Furnished Material (GFM)”, all labor, equipment, materials, parts, and supplies necessary for completing the work as shown on drawings or herein described shall be furnished by the shelter manufacturer. All equipment, materials and parts furnished by the shelter manufacturer shall be new, suitable for the intended use, and of proven design to adequately withstand the loads and conditions specified without damage, leaking, corrosion, warping, twisting, or any other deleterious effects. All exterior surfaces shall be either painted, hot-dipped galvanized (for metal components), or stainless steel. All exterior hardware shall be stainless steel.
- 4.0 Applicable Documents – The current issues of the following documents in effect on the date of the invitation for bid form a part of this specification and are applicable to the extent specified herein:
 - 4.1. FAA-C-1217: Electrical Work, Interior
 - 4.2. FAA-STD-019e; Lightning Protection, Grounding, Bonding and Shielding Requirements for Facilities.
 - 4.3. IEEE-1100; Recommended Practices for Powering and Grounding Sensitive Electronic Equipment.
 - 4.4. National Electric Code
 - 4.5. AC 70/7460 Paint Advisory Circular
- 5.0 Specification Notes:
 - 5.1. Shelter standard sizes – dimensions shown are exterior (feet), with internal 8 ft ceiling height, except as noted. Left shelter designates the power panel, etc. is located on the left side of the door when entering shelter. “Right designation” indicates a mirror image of the left design. A standard shelter is equipped with florescent lighting, lighting protection ground plates, 100 Amp electrical distribution panel, fused main disconnect and TVSS surge protector, thermostatically controlled fan/vent, standard “window style” AC unit and wall-mounted electric heater.
 - 5.2. Double throw switch and generator plug; 100Amp. This Contract Line Item (CLIN) adds to the standard power layout a means to use a generator to power the internal systems when commercial power is off-line at the site. A manual double throw switch and generator plug will be added to the configuration with only minor changes allowed to the original layout. The FAA will designate the external plug to be used on the shelter. External connections required will be specified to accommodate final destination of the shelter. Customers will select plug type from a variety of external plug configurations, pricing will allow for a variety of external plugs to be used. All plugs will be reverse service configuration.
 - 5.3. 200 Amp power service and 200 Amp double throw/external generator plug: The standard 100 Amp electrical service items are not used (credited) and 200 Amp service components are used; i.e. Fusible Disconnect – 200A – 150A fuse each leg; Main Panel – 225A capacity – Main Lug Only; TVSS unit capable of 200 Amp service. In addition to manufacturer-installed components, the shelter manufacturer shall at minimum install (5)-20A spare breakers in the panel.

FAALC FIBERGLASS SHELTER SPECIFICATION

Revision: 0.0

Revision Date: 3/14/2012

- 5.4. 200Amp Double Throw Service. As specified above in 5.2 for 100 Amp service, this CLIN adds the option to add a double throw switch and generator plug for 200 Amp service. This cost includes 200 Amp power.
- 5.5. Removal of exhaust fan/vent from standard shelter. The manufacturer will not cut the hole and install the fan/vent into the shelter wall during the manufacturing process. However, the manufacture shall maintain the internal wall structure (framed in) such that a fan/vent may be added at a future date with minimal structural change to the shelter.
- 5.6. Removal of air conditioner unit from a standard shelter and all related wiring/components. The manufacturer will not cut the hole and install the air conditioner into the shelter wall during the manufacturing process. However, the manufacture shall maintain the internal wall structure (framed in) such that a window style AC unit may be added at a future date with minimal structural change to the shelter.
- 5.7. Removal of heating unit from standard shelter and all related wiring/components.
- 5.8. Add a 1 ton single unit/source, combined heat and air distribution unit, Bard (WA121-A03XP1X3J) or equivalent. The use of Marv-Air products will not be accepted. Minimum levels of output as stated within contract specification, 1 ton unit. Standard AC unit and wall-mounted heater are removed (credited) with this application.
- 5.9. Add a 2 ton single unit/source, of combined heat and air distribution in a 2-ton capacity. Item has the same requirements and restrictions as 1 ton unit. Standard AC unit and wall-mounted heater are removed (credited) with this application.
- 5.10. Add HVAC environmental upgrade. Corrosion resistant package for both 1T and 2T units. This kit requires the single HVAC units to be constructed with stainless steel components to resist corrosion in salt-water or heavy industrial areas of the country. Must be combined with CLINs for 1 ton or 2 ton single HVAC units. Can include economizer package as well.
- 5.11. Add Economizer package for both 1T and 2T units. This kit requires the single HVAC units to be constructed with economizer package installed. Must be combined with CLINs for 1 ton or 2 ton single HVAC units. Can include stainless steel/corrosion package as well.
- 5.12. Add a Ductless Split System HVAC, Friedrich model M12YG or equivalent. Minimum levels of output as stated above. Standard AC unit and wall-mounted heater are removed (credited) with this application.
- 5.13. Add external lightning protection package. Package will contain at minimum; four air terminals, two down conductors, heavy duty connections for terminals and hold-downs, and connections from all exterior metal surfaces to the down conductors. Design specifications are found in FAA-STD 019e and related documents. Designs must be submitted and approved by the Government. Reference attached drawing for typical package components.
- 5.14. Custom built shelter/drawings. As the contract will contain standard shelters and related drawings for each designated size of shelter, the FAA recognizes that not all sites can utilize this configuration in relation to internal component layout. The contractor shall develop a standard cost to produce drawing for a customized shelter and also incorporate any additional cost potential for relocation of standard items within a shelter; e.g., power panels may move to a different wall, or the door location is moved.
 - a. In addition to the above, there may be cases where a city or site may require Professional Engineer approved drawings or stamped drawings from the state/city/municipality. The shelter manufacturer will be allowed to add reasonable charges for such requirements, approved by the FAA prior to the work.
- 5.15. Concrete shelters: The contractor may be required under this contract to provide for concrete shelter structures either by their own manufacturing or by sub-contracting to a qualified vendor. For internal work or sub-contracting of concrete shelters, the FAA reserves the right to determine if the selected vendor is qualified under FAA procurement rules and guidelines. All concrete shelters will be individually designed and quoted. See also paragraph 8.2 of specification.
- 5.16. RWSL Shelters: The RWSL Program is a requirement to place Runway Status Lights at key major airports around the country. These shelters can house up to four Constant Current Regulators (CCR) and associated Master Lighting Control (MLC) cabinets. The weight of these units is approximately 1200 lbs. each. In addition to this, the shelters contain an equipment rack, work bench, and storage cabinet. The building is powered with 480 Volt, 3-phase power. It also contains a step-down transformer to produce 120/240 volt power. The RWSL equipment and the

FAALC FIBERGLASS SHELTER SPECIFICATION

Revision: 0.0

Revision Date: 3/14/2012

transformer are all fastened to mounting plates within the floor to meet seismic requirements. Each shelter is built identically. Dual, 2-stage Bard units equipped with lead/lag controllers are used to cool and heat the shelter. Detailed drawings for the construction are provided by the FAA.

- 5.17. Engine Generator (EG) Shelters: Standard sized at 20' x 11'6", with a 9 foot ceiling height. The shelters have input and output air, plus exhaust requirements. Fuel for the EG can be diesel or propane with the installation of related components. The shelter can be built with double doors only or with an added personnel door. Installation of electrical equipment, generator, and related items may be required for these shelters. EG shelters other than 20' x 11'6" x 9' can be requested. EG shelters will be quoted on an individual basis and reviewed by the FAA.
- 5.18. Increase width or length: Contractor shall develop a standard cost structure to be able to allow for increases in shelter sizes, in two foot increments as noted in the CLIN structure, as a part of this contract. Along with materials, shipping costs should be considered as well. These CLINs will include the cost for custom drawings.
- 5.19. Hot-dipped galvanized landing platform, plus steps; with the landing being 3'-0" depth by 4'-6" width. Secured at the site on four legs. Approximate height 7 inches. Must meet OSHA requirements. Recommended surface material is heavy gauge expanded metal (grate). Unit must also be equipped with welded handrail(s). Individual, site-specific heights with corresponding number of steps/handrails are required.

Height	No. of Steps	Handrail req'd
7"	None	No
14"	One	Yes
21"	Two	Yes
28"	Three	Yes

The manufacturer shall install four (4) grounding lug/stud bolts locations, two studs each at 1-inch separation, on the lower rear legs of the landing, and four (4) grounding lug/stud bolts locations on the upper front legs. Additionally, two (2) grounding lug/stud bolts locations shall be installed on each upper side of detached steps (bonding across mechanical joints within the unit is required). The two-stud connection points shall be masked or covered during the galvanizing process such that bare metal is exposed beneath. The connection points shall accommodate a standard 4/0 long barrel crimp lug with 1" hole spacing. The 3/8" studs shall be a minimum of 1-1/2" length to accommodate the lug, a standard washer, 3 belleville washers, and a nut for proper grounding per FAA specs.

- 5.20. OEM Field Support: This element may include shipment of shelter options or accessories; e.g., fan/vent hoods, door rain hoods, lightning protection kits, etc., on an as-required basis. This element may also include on-site work which must be performed by the OEM so as to not void the building warranty; such as HVAC addition, relocation and/or change-out; door orientation change-out; electrical modifications such as panel change-out to upgrade from 100 amp to 200 amp or vice versa, addition of external generator plug and transfer switch; performing wall penetrations and associated fiberglass repair; and floor plate modifications, relocations, and/or change-out. Element will be quoted on an individual basis.
- 5.21. Expedited manufacture. Occasionally a customer requires a shelter in a minimal time frame. This CLIN will be priced in one week increments, and will be applied to the standard six-week interval as necessary to achieve the desired delivery date; e.g., one increment will result in five-week delivery, two increments will result in a four-week delivery, etc.
- 5.22. Certain climates and/or equipage options may require the addition of a second HVAC unit. This CLIN shall include the cost of a lead/lag controller.

- 6.0 Shelter Drawings: The shelter manufacturer shall originate and provide the design drawings based upon the generic drawings provided by the FAA Logistics Center. These drawings shall demonstrate detailed specifications of the different interior and exterior exposures. In addition, the drawings shall include electrical layouts and all options for the shelters. The shelter manufacturer shall include in the documentation a foundation plan for each size shelter built for the FAALC for proper construction at FAA facilities. Generic designs for grade beam, slab, and pier construction are required to be provided.

6.1 Standard Size Requirements

6 x 8 feet	8 x 16 feet	10 x 12 feet	10 x 20 feet
8 x 12 feet	11 x 20 feet	10 x 16 feet	12 x 26 feet

FAALC FIBERGLASS SHELTER SPECIFICATION

Revision: 0.0

Revision Date: 3/14/2012

- 6.1.1. Shelter designations are “Left” or “Right” along with the shelter size. “Left” or “Right” is identified, as upon entrance to a shelter, the power panels would be located to the left or right of the entrance. For reference, attachment 3, this package is a “Left” designation shelter. A “Right” designation would be the mirror image of that drawing.
 - 6.2. The shelter manufacturer will be required to produce shelters of an opposite or “mirror image” of the shelters designated below. Drawings for these shelters are required where applicable.
 - 6.3. The Shelter Manufacturer shall provide two (2) paper copies of final drawings and one (1) electronic copy in a format approved by the FAALC.
 - 6.3.1. (Manufacturer Drawing No.): 12-foot by 26-foot Fiberglass Equipment Shelter Manufacturer Requirements Floor Plan and Elevations.
 - 6.3.2. (Manufacturer Drawing No.): 11-foot by 20-foot Fiberglass Equipment Shelter Manufacturer Requirements Floor Plan and Elevations.
 - 6.3.3. (Manufacturer Drawing No.): 10-foot by 20-foot Fiberglass Equipment Shelter Manufacturer Requirements Floor Plan and Elevations.
 - 6.3.4. (Manufacturer Drawing No.): 10-foot by 16-foot Fiberglass Equipment Shelter Manufacturer Requirements Floor Plan and Elevations.
 - 6.3.5. (Manufacturer Drawing No.): 10-foot by 12-foot Fiberglass Equipment Shelter Manufacturer Requirements Floor Plan and Elevations.
 - 6.3.6. (Manufacturer Drawing No.): 8-foot by 12-foot Fiberglass Equipment Shelter Manufacturer Requirements Floor Plan and Elevations.
 - 6.3.7. (Manufacturer Drawing No.): 8-foot by 16-foot Fiberglass Equipment Shelter Manufacturer Requirements Floor Plan and Elevations.
 - 6.3.8. (Manufacturer Drawing No.): 6-foot by 8-foot Fiberglass Equipment Shelter Manufacturer Requirements Floor Plan and Elevations.
 - 6.3.9. (Manufacturer Drawing No.): Shelter Foundation Details
 - 6.3.10. (Manufacturer Drawing No.): 3-0 foot by 4-6 foot Shelter Galvanized Step Details in one, two, and three step configurations.
 - 6.3.11. (Manufacturer Drawing No.) Basic shelter lightning protection components and installation layout (reference FAA-STD 19e).
 - 6.4. The release of drawings or any other information or material related to shelters or products produced under this contract must be coordinated through the Contracting Officer (CO) or Contracting Officer’s Technical Representative (COTR).
 - 6.5. The drawings produced by the Contractor for the generic design, including revisions, or any buildings purchased under this contract become the property of the Government. The Government reserves the right to further use these drawings without limits, for site development and design, customization, etc.
- 7.0 Shelter Manufacturer’s Qualifications – The shelter manufacturer shall be regularly engaged in the fabrication of pre-assembled fiberglass equipment shelters with existing plant facilities equipped for year-round shelter manufacturing. Plant shall be capable of producing multiple shelters simultaneously and multiple quantities (minimum 12) per month for this contract.
- 8.0 Shelter Type: The shelter shall be a prefabricated, pre-assembled fiberglass portable building using standard manufactured sizes. The use of concrete or metal for the structure or metal for the exterior surface is NOT permitted except for below listed items. The use of fiberglass material for the A/C rain hoods, vent/fan hoods and door cap is required.
- 8.1. Any metallic materials used for the shelter skids, door, or other small attachments on the exterior shall be made of stainless steel, hot-dipped galvanized steel, or marine grade aluminum.
 - 8.2. The predominate majority of equipment shelters are of fiberglass construction. In rare instances, our customer requires a portable concrete shelter. In those cases, the fiberglass shelter vendor shall be responsible for procuring the required concrete shelter from an approved concrete manufacturer and assuring its full and complete compliance with specifications herein.

FAALC FIBERGLASS SHELTER SPECIFICATION

Revision: 0.0

Revision Date: 3/14/2012

- 9.0 Manufacturing Time requirements - As a part of the solicitation, the manufacturer shall respond with their proposed timeline of shelter deliveries. However, at no time shall shelter deliveries exceed fifty six (56) days beyond Purchase Order submittal to the manufacturer. Exceptions to this rule are spelled out in the contract documentation; i.e. large order requirements.
- 10.0 Shelter Size – Shelter manufacturer shall provide shelters with the following standard dimensions. Dimensions given (with exception of ceiling height) are nominal exterior dimensions. A larger size is acceptable if the shelter manufacturer has a factory standard. Manufacturer's larger size shelters shall not be greater in size than allowed for transport over the continental highway system.
- 10.1. Although these are the standard sizes that will be used under this contract, the contract is not limited to these sizes and/or configuration. Different configurations of shelters shall be available under this contract at pre-priced increments. Shelter manufacturers must be able to produce at minimum, shelters of 14-foot by 30-foot in exterior size.
 - 10.2. 10-foot by 20-foot by 8-foot minimum interior ceiling height
 - 10.3. 10-foot by 16-foot by 8-foot minimum interior ceiling height
 - 10.4. 10-foot by 12-foot by 8-foot minimum interior ceiling height
 - 10.5. 8-foot by 12-foot by 8 minimum interior ceiling height
 - 10.6. 8-foot by 16-foot by 8-foot minimum interior ceiling height
 - 10.7. 6-foot by 8-foot by 8-foot minimum interior ceiling height
 - 10.8. 12-foot by 26-foot by 8-foot minimum interior ceiling height (RWSL Building). The RWSL buildings are unique in the requirement that they must meet heavier floor loading requirements with 1200 lb. CCR/MCL cabinets. The shelter must have the capability to be lifted with units installed, max 4, along with equipment cabinet rack and other standard shelter items; workbench cabinet, etc. See specific RWSL shelter drawings for additional details.
 - 10.9. 11 ft, 6 in by 20-foot by 9-foot minimum interior ceiling height (standard engine generator buildings). The engine generator shelters have additional floor loading requirements to support the lifting and transportation of engine generator equipment installed within, along with other associated EG equipment such as power panels, transfer switches, etc. The shelter manufacturer must have the capability to be able to install such equipment and test within their facilities. Each unit requested will require the contractor to quote the individual shelter and related work. Quotes will be processed internally to the FAA to determine the appropriateness of figures presented. Quotes deemed unacceptable will allow the FAA to bid externally to the contract.
- 11.0 Operating Environment – The shelters shall be dust-proof and watertight. The shelters shall be capable of withstanding any probable combination of the following conditions without mechanical or electrical damage or degradation of performance below that specified herein:
- 11.1. Environment temperature range of minus (-) 58 to plus (+) 158 degrees Fahrenheit.
 - 11.2. Wind velocities up to 150 miles per hour (mph) when secured in place.
 - 11.3. Exposure to corrosive/salt atmosphere as encountered in coastal areas; e.g., Florida.
 - 11.4. Rainfall as encountered in coastal areas; e.g., Washington.
 - 11.5. Snow/ice as encountered in northern states; e.g., Alaska.
 - 11.6. Relative humidity up to 100% with any temperature specified above.

FAALC FIBERGLASS SHELTER SPECIFICATION

Revision: 0.0

Revision Date: 3/14/2012

- 12.0 Structural – Each in-place structure, including all components, connections and attachments, shall be designed to satisfy the following conditions. Design shall conform to all requirements for “essential facilities” of current edition of the Uniform Building Code (UBC).
- 12.1. Seismic – Zone 4.
 - 12.2. Wind – 150 mph ($q_s = 30$ psf), exposure D.
 - 12.3. Floor live load – 300 pounds per square foot (psf) and a concentrated load of 175 pounds on a 3-inch round disk anywhere over the floor surface.
 - 12.4. Roof live load – 70 psf.
- 13.0 Floor – The following or equal are minimum requirements for the floor:
- 13.1. Sub-flooring shall be constructed of minimum $\frac{3}{4}$ inch exterior grade plywood on the inside; wood or steel channel floor joists (sized and spaced to meet loading), and $\frac{1}{2}$ inch exterior grade plywood, or equal, on the outside. The $\frac{1}{2}$ inch plywood shall be protected by spraying/ rolling (minimum $\frac{1}{4}$ inch mixture) of polyester resin and chopped fiberglass or equivalent, and final finish of gelcoat on the exterior before installation onto the skid.
 - 13.2. Interior of the floor shall be covered with commercial grade no-wax vinyl flooring or FAA approved equal or better. A 4-inch vinyl base or equivalent shall be provided at the walls.
 - 13.3. The floor shall provide a minimum insulation value of R-11.
- 14.0 Roof – The shelter roof shall support a live load of 70 psf. The following or equal are minimum requirements for the roof:
- 14.1. The roof shall be sloped a minimum of $\frac{1}{4}$ inch per foot to prevent water from standing. The interior ceiling shall provide a support structure of sufficient strength which is flat, level and perpendicular to shelter walls to support electrical fixtures, hardware, cable trays, etc. when mounted by either the manufacturer or end-user. Maximum distance between support members shall be no greater than two (2) feet.
 - 14.2. The roof shall provide a minimum insulation value of R-19.
- 15.0 Walls – The following specifications or equivalent are minimum requirements for the walls:
- 15.1. The interior walls shall provide a surface support structure of sufficient strength to support electrical fixtures, hardware, etc. when mounted by either the manufacturer or end-user. Maximum distance between internal support members shall be no greater than 8 inches.
 - 15.2. Manufacturer shall apply FRP-coated $\frac{3}{4}$ ” inch plywood panels to be affixed to all interior wall surfaces.
 - 15.3. The walls shall provide a minimum insulation value of R-19. No fiberglass bat insulation or loose material insulation shall be used within the walls.
- 16.0 Door – The door shall be of sufficient depth and strength to provide durability, insulation, and security to the structure. Vendor’s door shall be equivalent or superior design to JRJ Alum-Fab part number D-CD00053HL (hinge left) or D-CD00053HR (hinge right).
- 16.1. The door width shall be specified in the individual specification drawings, minimum 34” opening or clearance. Door height shall be a minimum of 6 feet 8 inches. Exterior door surface color shall match or blend with exterior paint markings of shelter.
 - 16.2. The door shall be mounted with three (3) stainless steel security type hinges or equivalent. The hinges shall be tamper-resistant with preferred location on the inside of door and frame to prevent vandalism.
 - 16.3. The entire door shall be seamless (no visible seams) or welded.
 - 16.4. The door shall provide a minimum insulation value of R-10.

FAALC FIBERGLASS SHELTER SPECIFICATION

Revision: 0.0

Revision Date: 3/14/2012

- 16.5. The door shall close and latch at a minimum of three points to provide a positive watertight seal. This latching mechanism shall be controlled by a single actuator which latches the door at three or more points.
- 16.6. The lock set shall be a heavy-duty Best cylindrical lock. The lock shall have a removable construction core and be provided with two (2) construction core master keys and one- (1) construction core control keys (final keying to be completed by others). All shelters leaving the vendor will be keyed identically. The exterior lock entry shall be covered to avoid dust, dirt, or water entry.
 - 16.6.1. The vendor shall supply the FAALC with ten (10) construction master keys upon first, standard delivery. Additional keys shall be made available upon request over the life of the contract, no more than 10 per year.
- 16.7. The door seal or gasket shall be of a heavy-duty material. Minimum thickness of the material shall be 3/8-inch and no less than 1/2-inch in width. The door seal shall be mounted in such a way as to provide protection against damage from entry of personnel or equipment into and out of the shelter and minimize deterioration of the seal from the natural elements. Seals mounted on a flat doorframe structure do not provide such protection. When properly closed, the seal shall provide protection from water entry into the shelter against strong, hurricane-strength winds.
- 16.8. A hydraulic door closure is required as a means of supporting or holding the door in an open position and prevention against damage from wind.
- 16.9. A rain hood over the door is required. The rain hood shall extend beyond each side of the door by a minimum of three (3) inches. The rain hood shall extend away from the building a minimum of twenty (20) inches.
- 16.10. Doors shall be available in both left and right hand models with no increase in contract price for materials and/or installation.
- 17.0 Exhaust fan and powered vent – Minimum diameter is 12 inches and maximum diameter is 18 inches. In the event that the fan/vent is not required, the wall structure shall be built to easily accommodate a retrofit (framed-in but not cut out).
 - 17.1. Fans and vents shall incorporate a housing and louver that will eliminate dust penetration into the shelter and provide for a positive seal against air penetration.
 - 17.2. Fan/vent hoods shall incorporate a screen on the exterior to alleviate insects entering the shelter. The vent shall incorporate a filter that is removable and cleanable to prevent dust from entering the shelter through the ventilations. The mechanism to hold the filter should be easily operated to open and close yet securely encompass the filter and seal from dust entering around the filter.
 - 17.3. Fan/vent shall be thermostatically controlled units interlocked to operate simultaneously.
- 18.0 Skids – The shelter shall be mounted on a skid made of all-welded steel construction. Skid shall be hot-dipped galvanized after fabrication. Skid shall provide the necessary strength for hoisting and lifting and to meet all other requirements specified herein. Skids shall be provided with a means of lifting (i.e. lifting eyes) on each of the four corners; these points shall extend beyond the edge of the shelter or alternative means provided to protect the shelter exterior during lifting. In addition to the shelter weight, these lifting points shall be sufficient to carry a minimum of 1500 lbs. internal to the shelter, with the exception of Engine Generator and RWSL shelters. See generic drawings for typical equipment placement and weight. The steel floor joists shall be welded to the skid. Typical skid construction includes heavy “I” beam longitudinal runners braced at each end with secondary “I” beams or steel pipe, heavy channel or angle for floor joists, and heavy channel or angle for perimeter support. The skid shall be designed to fit the foundations plans developed by the shelter manufacturer.
 - 18.1. Offloading and placement of shelters is frequently performed by forklift. A skid framework design is required which accommodates such movement without compromising safety and prevents damage to the shelter floor. For that reason, all shelters shall be equipped with the following beam configurations:
 - 18.1.1. Shelters 8’ or less in width shall have a minimum of three full-length longitudinal I-beam runners.
 - 18.1.2. Shelters >8’ in width shall have a minimum of four full-length longitudinal I-beam runners.
 - 18.1.3. Shelters >12’ in width shall have a minimum of five full-length longitudinal I-beam runners.

FAALC FIBERGLASS SHELTER SPECIFICATION

Revision: 0.0

Revision Date: 3/14/2012

- 19.0 Electrical/Power Requirements (reference attachment 3 for location): Electrical installations shall conform to the latest edition of the National Electrical Code, FAA-C-1217, FAA-STD-019, IEE-1100, and in accordance with the following requirements. If specifications are in conflict, the FAA requirement shall take precedence over the NEC. In no case, however, shall the NEC be violated. All components used shall be rated heavy duty, industrial or commercial.
- 19.1. Bonding: The panel board enclosure, grounding bar, and service entrance raceway shall be effectively bonded together. Bonding jumpers shall be minimum No. 6 AWG copper conductor. Neutral bar shall be isolated from the grounding bar in the panel board. Only at the main disconnect shall neutral and ground be bonded together. Grounding bar connection points for the panel shall exceed breaker capacity by at least 50%.
- 19.2. Main Panel: 100A capacity – Main Lug Only – In addition to manufacturer installed components, the shelter manufacturer shall install at minimum (3)-20A spare breakers in the panel. A bolt-in type breaker or equivalent shall be used. A double-hinge panel is required
- 19.2.1. 200A capacity option shall be priced as well
- 19.3. Fusible Disconnect – 100A: Shall be equipped with a 100A fuse each leg
- 19.3.1. 200A capacity option shall be priced as well.
- 19.3.2. Spare fuses shall be supplied with each unit. (2ea standard shelters, 3 each RWSL shelters).
- 19.4. Runway Status Light (RWSL) shelters shall contain 480V service as specified in the FAA drawings. The shelter manufacturer shall build and price accordingly with no substitution of components. Typical installation contains a 480V disconnect (NEMA 3), 480V panel (NEMA 3), transformer, and 120/240 V, 200Amp (NEMA 3) panel.
- 19.5. Engine Generator (EG) shelter electrical configurations will be negotiated on an individual basis due to varying shelter and layout designs.
- 19.6. Surge Arrestor: The manufacturer shall install an FAA approved and certified TVSS device in the power system of the shelter. This unit must be lifetime tested and pass such tests at a recognized testing facility with FAA observation. Conducted tests shall be FAA approved to meet FAA requirements as designated by the FAA Power Service Office (AJW-22). Final approving authority falls to the above-specified office of the Government. The specified TVSS must be UL listed.
- 19.6.1. Surge Arrestor shall be Rayvoss (120-2S-M3-3-06-A) or equivalent
- 19.6.2. 200A capacity option shall be priced as well.
- 19.7. Grounding Plates: The manufacturer shall install in accordance with the specifications. Plate size is called out in the specifications. The Government shall provide plate design.
- 19.7.1. For the 6x8 shelters, one ground plate is required. The Government shall provide the location for mounting of the plate. Plate covers shall be designed and labeled per FAA-STD-019e.
- 19.7.2. For shelters 8x12 and larger; the contractor shall provide two ground plates, Main Ground and Supplemental Ground and placed as designated by the Government. Plate covers shall be designed and labeled per FAA-STD-019e.
- 19.7.3. The contractor shall install 1-1/2" PVC conduit through the floor for installation of the main and supplemental (if applicable) ground conductors. The PVC shall end at a point approximately 8 inches from the ground plate(s) and shall have a means to extend the PVC on the exterior of the shelter to the site counterpoise.
- 19.7.4. Lugs used within the shelter shall be hexagonally crimped Per FAA-STD-019e.
- 19.7.5. The contractor shall install 1-0" PVC conduit through the floor for installation of the door ground conductors (hinge side).
- 19.8. Interior Outlets: The manufacturer shall install 20A industrial-grade electrical outlets, minimum 1 per wall, spaced every 4-6 ft., 18 inches above floor unless otherwise directed.
- 19.8.1. One GFI outlet shall be mounted on the interior wall, near the door.

FAALC FIBERGLASS SHELTER SPECIFICATION

Revision: 0.0

Revision Date: 3/14/2012

- 19.9. Interior lights: The manufacturer shall install (6) each in 12x26, (4) each in 10x20, 10x16, 10x12, & 8x16, (3) each in 8x12, and (2) each in 6x8 shelter. Minimum distance from walls for ceiling installation is 12 inches. All fixtures are to be mounted two inches below ceiling surface to allow conduit to run between fixture and ceilings.
- 19.9.1. Interior lighting circuits shall use UL approved fixtures, switches, and lamps with wiring that conforms to NFPA-70.
- 19.9.2. All Lighting shall be of the type that is filtered to prevent RFI.
- 19.9.3. Each lighting circuit shall be supplied with its own on/off switch at the entrance.
- 19.9.4. Battery-powered interior emergency lighting shall be provided. Emergency lighting shall automatically illuminate in the event power fails and shall extinguish when power is restored. An illuminated exit sign shall be included within the fixture (EXIT/EM-SF-R-WHT-SDT or equivalent).
- 19.10. Exterior light: Shall be photoelectric and switch controlled.
- 19.11. Ground bushings: Shall be installed on all conduits.
- 19.12. Skid Grounding: The manufacturer shall install four (4) grounding lug/stud bolts locations, two studs each at 1-inch separation, on all four corners of the shelter skid and shall be readily accessible for tie-in to the local grounding grid. Each grounding connector (field installed by others) shall tie to the skid with two bolts/studs welded to the skid. The two-stud connection points shall be masked or covered during the galvanizing process so that bare metal is available beneath. This connection point shall accommodate a standard 4/0 long barrel crimp lug with 1" hole spacing. The 3/8" studs shall be a minimum of 1-1/2" length to accommodate the lug, a standard washer, 3 belleville washers, and a nut for proper grounding per FAA specs.
- 19.13. Metal Component Grounding: All large metal components of the shelter, i.e. door, shall be grounded to the building skid. Final determination of those metal components which require grounding shall be made by the Government.
- 19.14. Electrical conduit penetrations: The shelter structure/skid shall be built such that vertical conduits mounted on any interior wall can penetrate directly through the floor. On any two opposing walls, generally the longer walls for a rectangular structure, the ability to extend a 2-inch vertical conduit down the wall, through the floor, and into the ground below the structure without interference from the main skid beams is required. Conduit access from outside the shelter shall be available on the long walls; i.e. inset front/rear skid beam. For the remaining two opposing walls, the ability to install a 4-inch vertical conduit without skid interference is required.
- 19.14.1. Penetrations for electrical conduit, i.e. power input shall use a threaded flange/bulkhead plate mounted to the shelter exterior that can be attached to in the field, i.e. LB connection. The bulkhead plate shall be securely mounted to avoid turning and shall be sealed so as to not allow water penetration into the wall.
- 19.14.2. Conduit exit points for grounding, etc. shall be installed prior to application of chopped fiberglass resulting in sealed conduits extended at a 45° angle. Care should be taken to avoid installation of ground conduits directly below incoming power penetration/bulkhead plate.
- 19.14.3. At no point shall a simple or single bead of caulking, silicon, etc. be considered adequate or allowable for wall penetrations.
- 20.0 Environmental Requirements (see drawing for location): The manufacture shall install national vendor A/C and heating units for which warranty or repair service is readily available.
- 20.1. AC – 10,000 BTU min., wall/window mount - thermostat controlled (standard equipment).
- 20.2. Wall heater, forced air – 3000 W min., surface-mounted housing, and thermostat controlled (standard equipment).
- 20.2.1. A temperature control system which prevents both units running concurrently is required.
- 21.0 Openings – Wall openings for door, air conditioners, fans, vents, etc., shall be fiber-glass matt wrapped prior to application of exterior chopped fiberglass with a minimum of 1-inch overlap from the outside in full thickness of the wall and continued to the interior side. All attachments to the shelter exterior shall be adequately caulked with a silicon product to seal for water penetrations.

FAALC FIBERGLASS SHELTER SPECIFICATION

Revision: 0.0

Revision Date: 3/14/2012

- 22.0 Paint Configuration -The exterior shall be painted white and orange, checkerboard pattern, using existing color and configuration specifications. Exterior surfaces for the door, hoods, rain cap, and boxes shall match the desired paint scheme.
- 22.1. As listed in the specification paint shall be gloss, gel-coat material. UV inhibitors shall be used to protect paint from fading and/or bleeding.
- 22.2. Contractor shall allow for the use of other paint colors in a solid format at no additional charge to the Government.
- 23.0 External Junction Boxes: The manufacturer will have facilities available to store minimal quantities of exterior junction boxes to be used on shelters. These boxes will be Government Furnished Material (GFM) and shipped with designated direct site shipped shelters.
- 24.0 FAA Inspection – The Federal Aviation Administration (FAA) or designated representative, shall, during any normal working hours, be permitted to view the work being done. Shelter manufacturer shall correct the work on any part of the job if such work is not being done in accordance with this specification. The shelter shall be made available for final inspection at shelter manufacturer's plant before shipment.
- 25.0 Submittals Process
- 25.1. Submittals – Transmittal letters identifying the contents of the submittal shall accompany all submittals. Submittals shall accompany the vendor's proposal. Submittals shall be complete, detailed, and assembled in sets. Lack of completeness or inadequate description will be justification for disapproval.
- 25.1.1. Within two weeks after each delivery order (DO) is awarded, the Contractor shall submit an electronic copy (AutoCAD) of the individual site-specific design for FAA COTR review. Design approvals and/or changes will be done at that time. A final FAA customer review may be a part of this review process.
- 25.1.2. The checking, marking, or approval of the shop drawings and/or product data by the FAA shall not be construed as a complete check, but will indicate only that the general method of construction and detailing is satisfactory. Approval will not relieve the contractor of the responsibility for the dimensions and design of adequate connections, details, and satisfactory construction of all work.
- 25.1.3. The Contractor shall only take direction for changes under this contract from the Contracting Officer (CO). Any changes that incur additional costs must be approved through the CO. Any changes directed by the FAA field or other customers should be directed to the CO/COTR. The Contractor is responsible for additional costs incurred if this process is not followed.
- 25.2. FAA Approvals
- 25.2.1. Approved as Submitted – If drawings are indicated "approved as submitted," (typically via email) the approved revision of the shop drawings or product data will be identified as having received such approval by an appropriate and consistent drawing revision control process. After submittal has been approved, the FAA will permit no substitution without written approval.
- 25.2.2. Approved as Noted – If drawings are marked "approved as noted," the shop drawings or product data is satisfactory contingent upon contractor performance of corrections, notations, or both and, if accepted, does not require re-submittal.
- 25.2.3. Not Approved – If drawings are marked "not approved," the shop drawing or submittal data do not meet job requirements and the contractor must resubmit. If shop drawings or submittal data are disapproved, the contractor shall resubmit the corrected material, in the same quantity as specified for the original submittal.
- 25.3. Samples – The Government reserves the right to request samples of any products or materials proposed for use on this project. A core of the wall penetration from the electrical input will be shipped with each shelter.

FAALC FIBERGLASS SHELTER SPECIFICATION

Revision: 0.0

Revision Date: 3/14/2012

26.0 Transportation – The shelter price(s) shall be quoted freight on board (FOB) destination, Oklahoma City, and FOB origin. Transportation of direct-ship shelters to points within the US shall be detailed within the contract documents. The shelter manufacturer will submit any additional shipping charges in the original quote for direct site shipments.

- 26.1. Items that might be damaged during transportation (i.e. rain hoods, exterior light, fluorescent lights, etc.) shall be removed and properly packaged for shipment. The shelter itself shall be designed to withstand repeated hoisting or lifting stress in loading/off-loading for shipment by truck, and to properly withstand all road shock, which may be encountered during such means of transportation. Provisions, as necessary, to allow hoisting without damage to the shelter or equipment installed prior to shipment shall be included, i.e., lifting eyes, bolt-on lifting plates, cable guides, etc. Shelter manufacturer shall also provide hardware necessary for shelter-to-slab connection.
- 26.2. All damaged incurred during shipment from the manufacturer's facility to any designated destination is the responsibility of the shelter manufacturer.
- 26.3. The shelter manufacturer shall have the capability to ship their product overseas and arrive in a safe manner with no damage.
- 26.4. The shelter manufacturer is responsible for coordinating off-loading equipment for the FAA's "direct ship" sites, except for the FAA Logistics Center. The shelter manufacturer will submit these costs along with any additional shipping charges in the original quote for direct site shipments. Government reimbursements for claimed travel costs, including per diem, will be made in accordance with the Federal Travel Regulations (FTR), as amended, issued by the General Services Administration (GSA) and maintained on its website, <http://www.gsa.gov/>. It is the FAA's option to use this off-loading process.

27.0 Storage

- 27.1. The shelter manufacturer shall have facilities available to be able to store shelters, pending site readiness, in small quantities for periods up to 6 months. Storage of these shelters shall be at no cost to the Government for up to 60 days. Reasonable charges (as documented in the contract) for storage will be accepted following the 60-day period.
- 27.2. The manufacturers' shelters can be stored at FAA facilities for extended periods of time, up to 3 years, under non-powered conditions. During the manufacturing process or prior to shipment, the shelter manufacturer will provide a means to protect entry points, openings, and penetrations to the shelter from weather, insects, and/or other pests in anticipation of these extended periods. Components within the shelter susceptible to damage or deterioration from humidity, condensation and/or other factors shall be protected as well. Such damage or deterioration shall be covered under the warranty.

28.0 Warranties – Warranties and/or guarantees shall be required and shall include, but are not limited to, the following. Warranty work shall be performed by the manufacturer at the FAALC or the final destination at no additional cost to the FAA.

- 28.1. Shelter manufacturer shall provide a warranty for a minimum of five (5) years on the shelter against defects in materials, leaks (including but not limited to door gasket leaks and factory wall penetrations), workmanship, corrosion, and design deficiencies, and shall make repairs and replacements at no cost to the FAA. Repairs made shall resemble a like new condition. The shelter manufacturer shall have the capability to make all repairs at any FAA designated site.
- 28.2. This warranty shall also cover all components of the shelter for a minimum of one (1) year, unless otherwise specified, including but not limited to: door (5 years), door seals, door mechanisms, hoods, vents, and all electrical and/or mechanical components.
- 28.3. The air conditioning system is warranted for a minimum of one (1) year on parts and labor and five (5) years on the air conditioner compressor.
- 28.4. Shelter manufacturer shall provide the FAA with certificates of guarantees and warranties normally provided by manufacturers of all equipment and materials not listed above.
- 28.5. Warranties for the shelter and all products used on or in the shelter, including but not limited to any and all electrical, heat and AC components, will begin for the FAA at such time the shelter arrives at its final destination/installation. Holding, staging, or storage areas such as FAA Logistics Center, other FAA/Department

FAALC FIBERGLASS SHELTER SPECIFICATION

Revision: 0.0

Revision Date: 3/14/2012

of Defense (DOD) staging areas or the manufacturer's storage are not considered the final destination unless so designated by the Government. For the purpose of the warranty of all products and the shelter on stored units, the warranty shall begin after the unit has been stored for two years from date of initial delivery.

29.0 Quality Assurance

29.1. Workmanship – The shelter manufacturer shall perform all fabrication and assembly in a workmanlike manner, in accordance with approved industry practices and in conformity with this specification. Exterior shelter finish shall be true and plumb with no surface imperfections. Interior shelter component installation (electrical, etc.) shall be installed plumb and level as well. The completed shelters shall conform to applicable portions of the UBC.

29.1.1. The shelter manufacturer shall insure that internal manufacturing drawings and specifications are highly detailed and followed to great extent as to the construction of the shelter and layout of electrical components, including conduits, boxes, and major components within the electrical area. Problems and issues that require corrective action cause costly delays to the Government, both at the FAALC and potentially at field sites.

29.1.2. The Contractor shall perform tests on the shelter electrical and environmental systems to insure proper operation. The contractor shall provide documentation with each shelter on the performance of the HVAC unit. Tests shall include, but not limited to; high & low pressures on the refrigerant and electrical current measurements during operation for reference readings.

29.1.3. The shelter manufacturer shall be responsible for the repair or rework of all major issues or discrepancies discovered after delivery. A plan for repair or rework shall be submitted to the CO/COTR within 3 business days after notification of the problem in writing. The rework shall be accomplished within 10 business days. Repairs must be accepted by the Government to close issue. If the manufacturer cannot perform the rework within the stated period, the Government will correct the problem and bill the manufacturer on a time and materials basis based upon the FAALC current contractor rate. This amount will be applied as a credit on future shelter orders.

29.1.4. In cases where corrective actions from the manufacturer will cause significant delays to the Government, the Government reserves the right to make necessary corrections and apply appropriate charges back to the manufacturer. If related problems persist, the government can take corrective action with the manufacturer in the form of returned shipments and delinquency penalties. (Reference contract section F.3)

29.2. Leakage Testing – The shelter manufacturer shall factory test the completed shelter by concentrating a water spray of not less than 250 pounds per square inch (psi) aimed at the roof and each side, including doors, environmental units, and related structure. If leaks are discovered, shelter manufacturer shall make repairs and/or change the design accordingly and repeat tests until shelters are completely watertight. The Government reserves the right to witness these tests.

30.0 Hazardous Materials - No asbestos containing materials (ACM) nor lead based paint (LBP) shall be used in any fashion during the shelter manufacturing process. Shelter manufacture shall provide written certification of the same upon request.